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Preferences of AP position of the straight Caucasian facial profile

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ABSTRACT

Introduction: Several investigators have compared the perception of profile attractiveness between professional and non-professional people, different groups of clinicians, and different ethnic groups. Our aim was to study preferences for facial protrusion in the lateral view for a straight Class I profile and to study the influence of gender, age, sex preference, and profession.

Material and methods: Portrait images of one male and one female model with a Class I occlusal relationship were warped into nine different antero-posterior positions. An internet site was established to reach as many people as possible, and a request was sent by email to participate in a scientific experiment. Finally, 1707 Caucasian assessors could be grouped.

Results: The preferred male profile is the straight full ante profile. For a feminine facial profile, the straight average and the straight 2/3 ante profiles were perceived as the most attractive. Surgeons tended to give significantly higher scores to attractive (ante) profiles, which correlated strongly with scores of the orthodontists.

Conclusion: Whenever possible with combined orthodontic/surgery treatment, straight ante profiles should be aimed for.

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1. Introduction

Cephalometric measurements have followed the introduction of craniometry (dry skull measurements) and facial anthropometry (live head and face measurements) (Vegter and Hage, 2000; Bashour, 2006). Although the standards set by cephalometric measurements can correlate with judgements of facial aesthetics, they cannot be fully relied upon for a perfect evaluation of facial attractiveness (Peck and Peck, 1970; Proffit et al., 1992; Riedel, 1950). Edward H. Angle stated the paradigm of soft tissue as following the underlying skeletal structures, meaning that a perfect occlusion would cause an ideal face in harmony (Angle, 1907). According to Tweed, a Class I occlusion was a feature of a normal face, with a few exceptions (Tweed, 1945). Furthermore, both Downs and Riedel also associated facial pattern with occlusion (Riedel, 1950; Downs, 1948).

Contemporary literature agrees that facial beauty of the profile has changed over time (Auger and Turley, 1999; Nguyen and Turley, 1998). The media probably have the biggest influence today on our perception of beauty. The impact appears to be that the “Hollywood standard” has become the generally accepted cannon. In “Die

Röntgenostatik”, Schwartz suggested that there are subdivisions of a Class I profile which are generated by horizontally shifting the lower anterior face (Schwartz, 1958). Specifically, the lower facial half can slide forward in the antero-posterior direction, which creates a “straight ante profile”, whereas a “straight retro profile” holds a lower facial height more to the rear (Fig. 1). These two profile lines should be regarded as “straight” variations of the average. Schwartz also stressed that the head position is essential for evaluating a face in profile. Orientation of the head should occur according to the Frankfurt horizontal (FH). The line perpendicular to the FH ideally contains three outline landmarks (sellion, subnasal point, and the upper lip), and serves as a reference for the straight average profile (Schwartz, 1958; Gonzalez-Ulloa, 1962).

Our aim was to study preferences for facial protrusion in the lateral view for a straight Class I Caucasian profile, and to study the influence of sex, age, sex preference, and profession on such preferences.

2. Materials and methods

Portrait images were taken of one male and one female professional model with a Class I occlusal relationship. The models were seated and looking at a perpetual point and were oriented according to the Frankfurt plane. The images were taken with

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Abb. 4.
Fig. 1. Division of straight profiles according to Schwartz.

a digital camera (Nikon D80, 15–200 lens) by the same photographer. Based on the subdivisions of Schwartz (1958) there were nine variations constructed for each profile (Fig. 2).

The three acceptable profile types according to Schwartz are a straight average profile (also called the biometric face), a straight

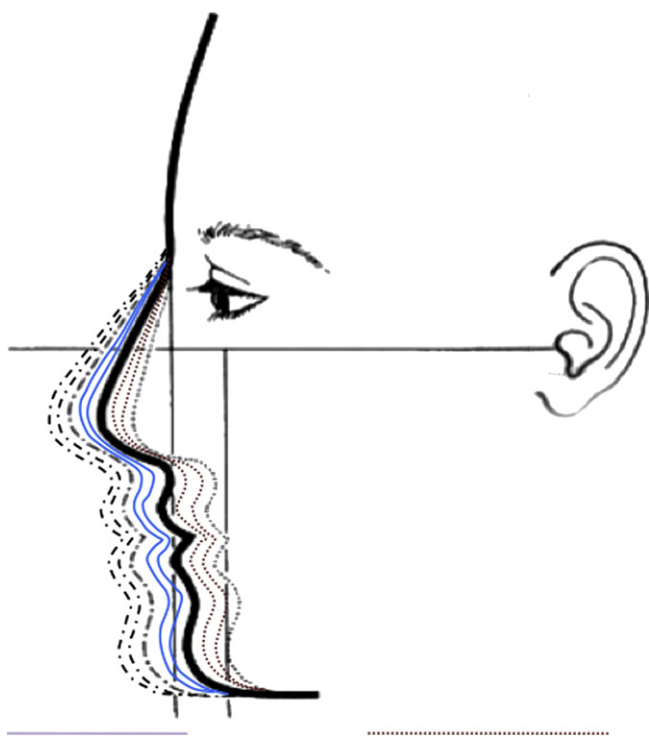


Fig. 2. A total of nine profiles were created for assessment.

“retro”-profile (where the lower anterior face is in a more dorsal position), and a straight “ante”-profile (where the lower anterior face is in a more ventral position). The maxilla and mandible are as one entity with a Class I occlusion with positive lip step. There were also six extra profiles constructed using the warping tool of Adobe® Photoshop® CS3. These extra profiles were generated as one third of the distance between the most ventral or most dorsal position of the lower anterior face according to Schwarz, and the average. A digital template was used as a base for warping the standard profile to a 2/3 retro profile, a 1/3 retro profile, a 1/3 ante profile, a 2/3 ante profile, a 4/3 ante profile, and a 5/3 ante profile. As a result, a full straight retro profile (Full-), a 2/3 straight retro profile (2/3-), a 1/3 straight retro profile (1/3-), a straight average profile (Av), a 1/3 straight ante profile (1/3+), a 2/3 straight ante profile (2/3+), a full straight ante profile (Full+), a 4/3 straight ante profile (4/3+), and a 5/3 straight ante profile (5/3+) made up the nine profile lines for the female (Fig. 3) and the male model (Fig. 4).

An internet site was established (www.facelook.be) in order to reach as many people as possible. Survey participants were recruited by email with the request for assistance in a scientific experiment. A welcome word explained the objective of the study, and the website was accessible when the potential participant indicated themselves to be 18 years or older. With informed consent, personal information was gathered in regards to age, sex, sexuality, ethnicity, professional occupation, and scientific background. These personal data remained anonymous.

The profiles were shown at random as a slideshow, which was manageable with a mouse click. Ratings of attractiveness were ranked with a visual analogue scale (VAS) that ranged from 0 (very unattractive) to 100 (very attractive). Participants were only allowed to score once in order to have a consistent group of observers. There was no time limit to complete the assessment in order not to cause mental pressure.

Statistical analysis was performed with IBM SPSS v19 (IBM Corp 2010 NY). The Fisher’s exact test was used for the analysis of associations between categorical variables. Group comparisons of the scores were analysed with the following non-parametric tests: Mann–Whitney *U*-test (two groups) and Kruskal–Wallis test (comparisons between more than two groups). The non-parametric correlation between variables was verified by means of the Spearman correlation. The non-parametric Friedman test was carried out to investigate whether there were significant differences between different profile types. Multiple range tests were performed with the Wilcoxon test with Bonferroni correction. Determination of the error of the method (reliability) took place by repeating the test after 2 months in 28 participants, from which the intra-correlation coefficient (ICC) was calculated. The significance level was set at $\alpha = 0.05$.

3. Results

A group of 1707 white observers (from 3145 website visitors) was obtained through the internet by means of an exponential mailing list. The mean age of the participants was 27.7 ± 11.1 years. The ages of the participants ranged from 18 to 78 years. From the sample of observers there were two age groups generated: under 30 years and older than 30. Of the 3145 website visitors, 1707 responded to all the questions, including 524 men (30.7%; mean age 32.2 ± 13.3 years) and 1183 women (69.3%; mean age 25.9 ± 9.3 years). Of these, 1548 were heterosexual, 60 were male homosexuals, and 99 were lesbian, which totalled 159 (9.3%) homosexual people. Regarding professions, 204 (12%) were general dental practitioners, 89 (5%) were orthodontists, 17 (1%) were orthognathic (OMF) surgeons, 2 (0.1%) were plastic surgeons and 1395 (73%) were non-professionals.



Fig. 3. An overview of the different profile types for the female model. The straight average profile is the median and has a value on the VAS of 50.

Regarding the female model, the profiles assigned the highest scores by the entire study sample were the straight average profile and the 2/3 straight ante profile. The profile types straight full retro, 5/3 straight ante, and 4/3 straight ante seemed to be least favoured by the study sample (Table 1).

For the male model, the profiles assigned the highest scores by the entire study sample were the straight full ante and the 2/3 straight ante. A distinct consensus was found for the least favourable profile types for the male model, which were, in descending order, 1/3 straight retro, 2/3 straight retro, and straight full retro.

The scores of all male profile types were significantly different according to the Wilcoxon test with Bonferroni correction, except for the 5/3 and the 4/3 ante profiles (Figs. 5 and 6).

3.1. Differences between sexes

Male and female raters both assigned the highest scores to the straight average profile and the 2/3 straight ante profile for the female model. Female participants gave higher scores for every type of female profile in comparison to men, but these scores were

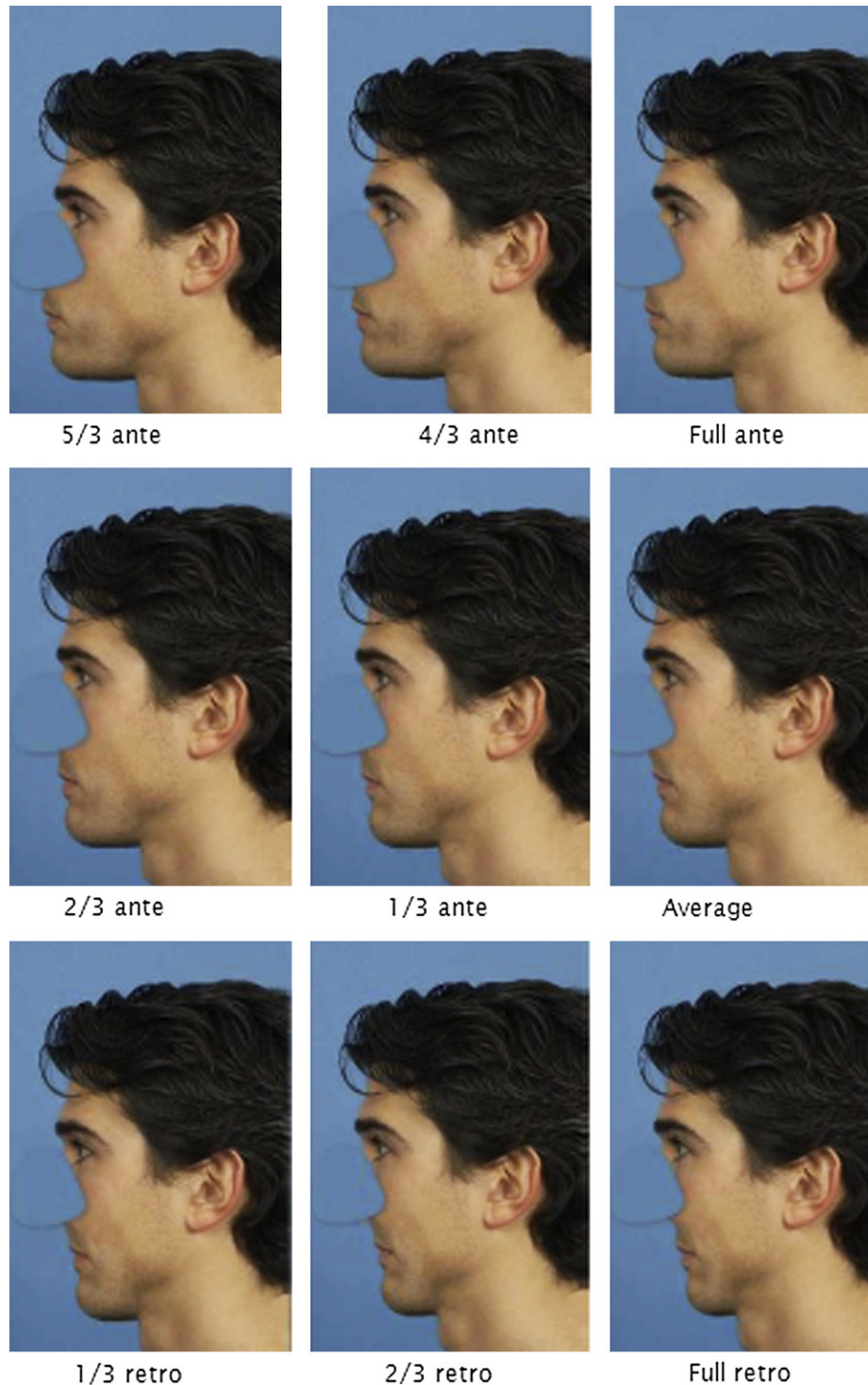


Fig. 4. An overview of the different profile types for the male model. The straight average profile is the median and has a value on the VAS of 50.

only significant for the average ($p = 0.008$), 2/3 retro ($p < 0.001$), full retro ($p < 0.001$), and 5/3 ante profiles ($p = 0.017$). The least attractive female profiles seemed to be all of the retro profiles, especially the straight full retro, the straight 5/3, and the straight 4/3 ante profiles.

For the male model, the profiles of preference were the full ante, 2/3 ante, 4/3 ante, and 5/3 ante profiles. These results were all highly significantly different for male and female participants, with women assigning higher scores (all $p < 0.001$). The male profiles considered to be the least attractive were 1/3 retro, 2/3 retro, and

full retro (all of which are retro profiles); however, these rates were significantly lower for the female group ($p = 0.022$, $p = 0.002$, and $p = 0.017$, respectively) (Table 1).

3.2. Differences between professions

Concerning professions, for the female profile, the 2/3 ante profile was considered to be the most beautiful profile for OMF surgeons, who assigned a significantly higher score than did dentists ($p < 0.001$), orthodontists ($p = 0.003$), and non-professionals

Table 1
Ranking of female and male profile (mean values and SD) according to age and gender.

N	Profile	Overall		Men		Women		>30		<30	
		1707		524		1183		418		1289	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Female	Average	59.4	14.4	57.8 ^a	14.8	60.2 ^a	13.9	59.7	14.0	59.3	14.3
	2/3+	58.8	15.5	57.7	16.1	59.3	15.1	59.3	15.1	58.6	15.6
	1/3+	54.4	13.2	53.4	13.9	54.8	12.8	55.6	13.3	54.0	13.1
	Full+	50.7	20.1	50.3	20.9	50.8	12.8	53.5 ^b	18.5	49.7 ^b	20.5
	1/3–	49.9	11.4	49.4	12.0	50.1	11.1	50.7	10.9	49.7	11.5
	2/3–	45.3	14.1	43.7 ^a	15.1	46.0 ^a	13.6	46.7	14.2	44.8	14.1
	Full–	35.8	15.3	34.7 ^a	17.7	36.2 ^a	14.1	37.8 ^b	15.8	35.1 ^b	15.1
	5/3+	28.2	19.2	27.4 ^a	20.9	28.5 ^a	18.4	31.9 ^b	19.1	27.0 ^b	19.1
	4/3+	26.5	18.7	25.9	20.0	26.8	18.1	30.8 ^b	18.3	25.2 ^b	18.7
Male	Full+	71.6	16.1	65.2 ^a	15.8	74.4 ^a	15.4	69.0 ^b	15.8	72.4 ^b	16.1
	2/3+	67.2	15.5	63.1 ^a	14.9	69.1 ^a	15.4	65.9 ^b	15.3	67.7 ^b	15.6
	5/3+	64.7	18.9	57.0 ^a	19.9	68.1 ^a	17.5	63.8	18.4	64.9	19.2
	4/3+	64.5	17.7	60.0 ^a	17.3	66.5 ^a	17.5	63.4 ^b	17.4	64.8 ^b	17.8
	1/3+	54.9	14.1	53.9	12.8	55.4	14.6	55.9	13.5	54.6 ^b	14.2
	Average	47.2	11.7	47.7	11.2	47.0	11.9	47.3	11.8	47.2	11.6
	1/3–	38.9	14.4	39.9 ^a	14.1	38.4 ^a	14.4	41.0 ^b	13.4	38.2 ^b	14.6
	2/3–	27.5	15.5	29.3 ^a	16.3	26.7 ^a	15.1	30.6 ^b	15.5	26.5 ^b	15.4
	Full–	22.2	15.9	23.5 ^a	16.4	21.7 ^a	15.6	25.0 ^b	15.6	21.4 ^b	15.9

SD, standard deviation.

^a $p < .05$, significance between different gender groups.

^b $p < .05$, significance between different age groups.

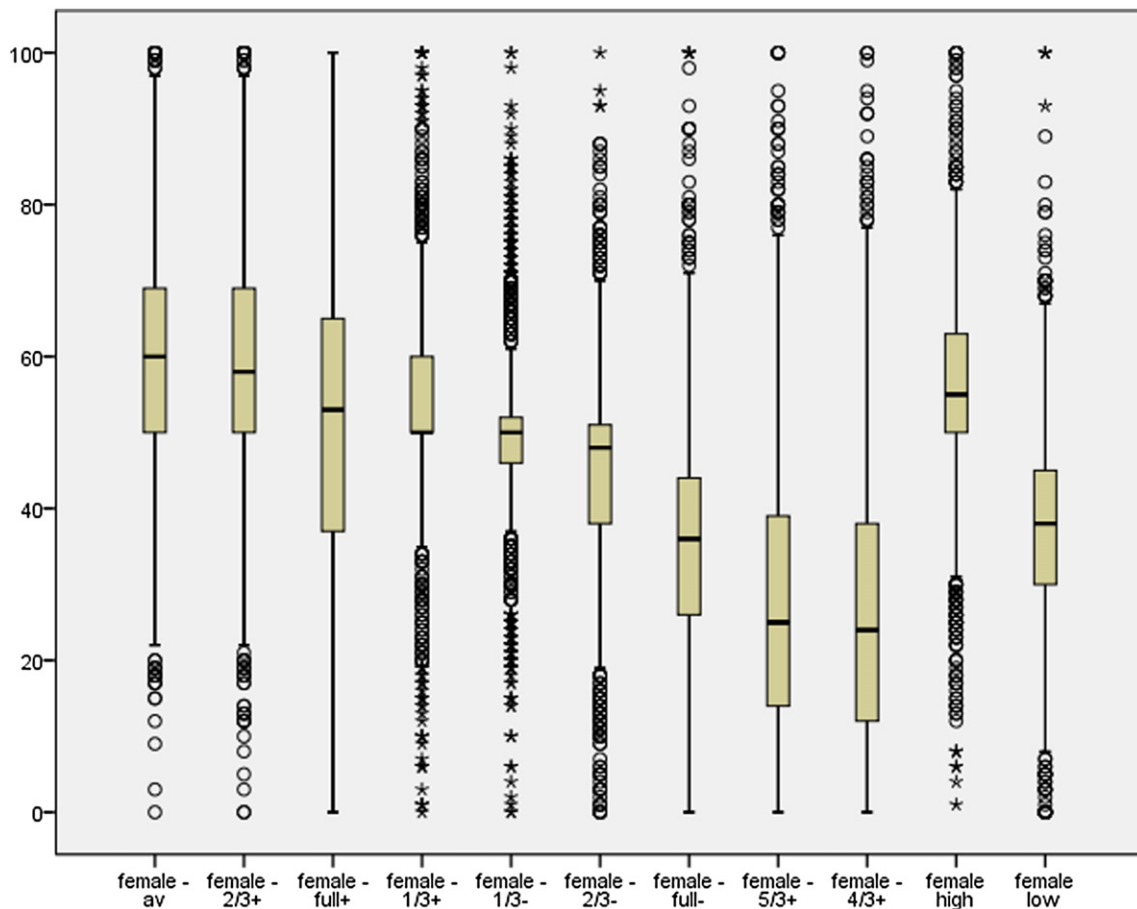


Fig. 5. Ranking of the female profile types.

($p < 0.001$). The average profile was found to be the most attractive profile according to orthodontists, dentists, and non-professionals, yet there were no significant differences for this profile type. OMF surgeons also assigned higher scores to the 1/3 ante and the full

ante profiles in comparison to dentists and non-professional people. For the full retro profile type, a significantly lower score was found for OMF surgeons in comparison to orthodontists, dentists, and non-professionals ($p = 0.005$, $p = 0.039$, and $p = 0.049$,

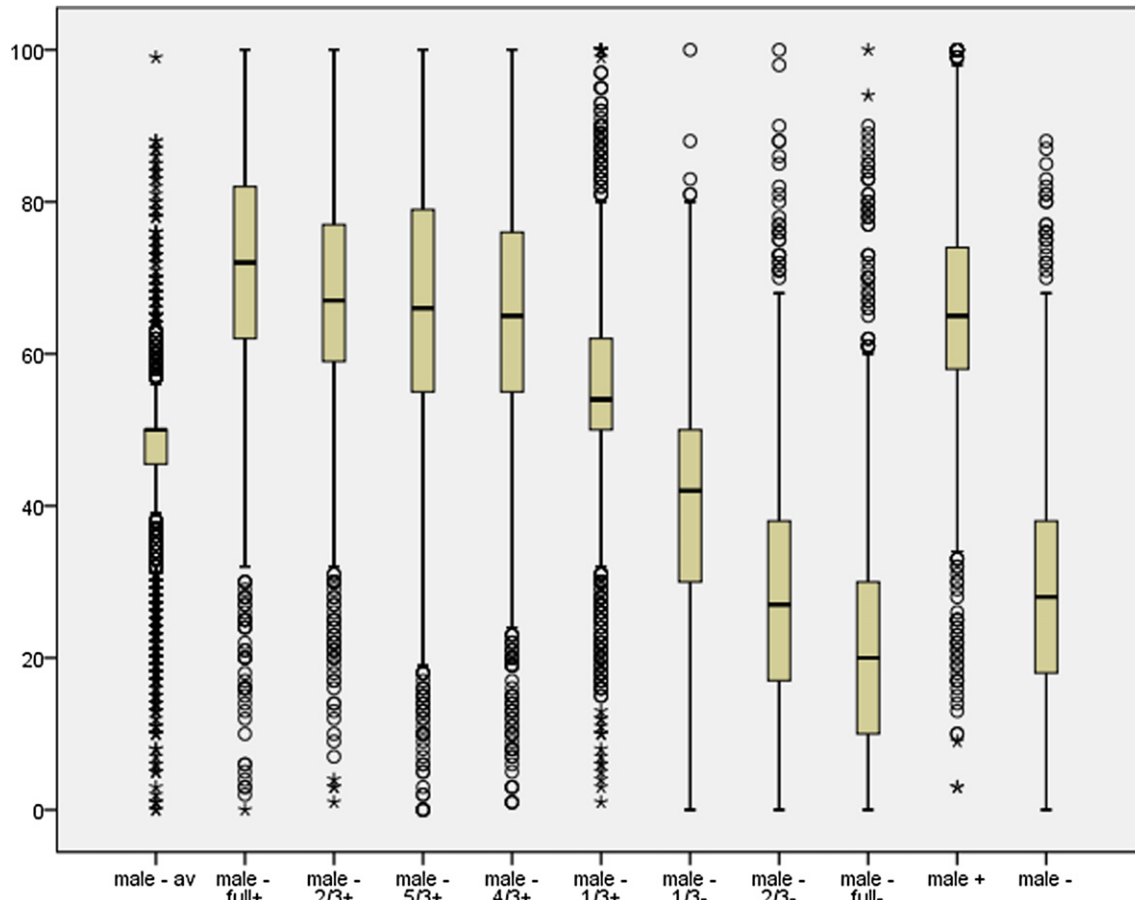


Fig. 6. Ranking of the male profile types.

respectively). The least attractive female profiles among the professions were consistently the 5/3 ante and 4/3 ante profiles, without significant differences.

Orthodontists assigned higher scores for every female profile type in comparison to dentists, non-professionals, and surgeons (except for 2/3 ante, full ante, and 1/3 ante).

For the male profile, orthodontists assigned higher scores than did the other groups for all profiles except 4/3 ante, for which surgeons assigned the highest score (Table 2). Surgeons seemed to prefer the 4/3 ante profile as most attractive; however, this was only significant in comparison to dentists and non-professionals. Compared with surgeons, orthodontists, and non-professionals,

Table 2
Ranking of female and male profile (mean values and SD) according to profession.

N	Profile	OMF surgeon		Orthodontists		Dentists		Laypeople	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Female	Average	60.4	14.9	62.5	15.2	59.6	14.1	59.2	14.1
	2/3+	72.1 ^a	10.9	62.0 ^a	14.4	58.8 ^a	14.5	58.4 ^a	15.6
	1/3+	60.1 ^a	19.1	59.1 ^b	13.1	55.5 ^b	13.1	53.8 ^{a,b}	13.0
	Full+	60.3 ^a	21.5	57.0 ^b	18.1	50.4 ^b	21.1	50.2 ^{a,b}	19.9
	1/3–	44.8	14.5	52.6	9.9	50.9	9.6	49.7	11.6
	2/3–	40.4	19.2	47.0	13.8	46.7	15.2	45.0	13.9
	Full–	30.3 ^{a,b}	18.5	38.7 ^{a,b}	13.7	36.3 ^a	15.4	35.6 ^{a,b}	15.6
	5/3+	23.6	19.5	30.5	18.6	27.5	19.6	28.2	19.2
	4/3+	22.7	18.2	30.6	13.2	25.3	17.4	26.5	19.0
Male	Full+	73.5 ^{a,b}	11.5	79.4 ^{a,b}	13.1	72.1 ^b	16.6	71.0 ^b	16.1
	2/3+	72.5	12.6	72.5 ^b	13.6	68.8	14.7	66.6 ^b	15.7
	5/3+	65.8 ^{a,b}	18.1	75.3 ^{a,b}	14.7	65.0 ^b	19.1	63.9 ^b	19.0
	4/3+	74.8 ^a	12.3	72.0 ^b	15.8	64.8 ^{a,b}	18.4	63.8 ^{a,b}	17.6
	1/3+	58.8	15.7	59.5 ^b	12.3	56.8 ^b	13.8	54.3 ^b	14.1
	Average	44.2	12.6	47.9	13.1	47.6	11.2	47.2	11.9
	1/3–	39.3	13.4	42.4 ^b	14.1	39.4 ^b	13.2	38.6 ^b	14.5
	2/3–	21.5	11.8	28.7	15.5	28.1	15.6	27.4	15.6
	Full–	16.3	12.1	24.4	14.8	21.8	14.9	22.3	16.1

SD, standard deviation.

^a $p < .05$, significance between orthognathic surgeons and other groups.

^b $p < .05$, significance between orthodontists and other groups.

the full ante profile seemed to be the most attractive type of profile for orthodontists regarding the male ($p = 0.050$, $p < 0.001$, and $p < 0.001$, respectively). Significant differences were found between orthodontists and all other groups for the full ante and 5/3 ante, and in comparison with dentists and non-professionals for the 4/3 ante, 1/3 ante, and 1/3 retro profiles.

3.3. Differences between people with different sex preference

There were no significant differences among profiles between heterosexuals and homosexuals except for the female average and the 4/3 ante profiles, whereby heterosexual people assigned a significantly higher score to the average profile ($p = 0.010$) and a significantly lower score for the 4/3 ante profile ($p = 0.010$). There was no significant difference between heterosexual and homosexual men for all the profile types, who assigned the highest score to the average and the 2/3 ante profiles for the female model and the full ante profile for the male model.

For the female model, homosexual women assigned higher scores to almost all of the profile types, but this was only significant for the 2/3 retro profile ($p = 0.041$). As for the male model, the full ante and 5/3 ante profiles were considered more attractive for lesbian women than for homosexual men ($p = 0.003$ and $p = 0.001$, respectively) (Table 3). Here, the same trend as for heterosexual men and women occurred, whereby homosexual women assigned higher scores for attractive ante profiles in a man and lower scores for unattractive retro profiles than did homosexual men. However, less significant differences were found, as only the full ante and 5/3 ante profiles were rated significantly higher by homosexual women ($p = 0.003$ and $p = 0.001$, respectively).

3.4. Differences between age groups

We observed that there were significant differences between those equal to or younger than 30 years of age and the group of people over 30 years. Relative to the younger group, older participants assigned higher scores to all of the profile types for the female model. In particular, these scores were significantly higher for the full ante ($p = 0.002$), the full retro ($p = 0.002$), the 5/3 ante

($p < 0.001$) and the 4/3 ante profiles ($p < 0.001$). Considering the male model, it appeared that people aged 30 years or younger tended to give higher values to the profiles with a more protruded lower anterior face than did those older than 30 years, with those specifically being the 2/3 ante ($p = 0.004$), the full ante ($p < 0.001$), the 4/3 ante ($p = 0.031$) and the 5/3 ante profiles. The scores given by people of 30 years or younger for the less protruded and retracted profile types and full retro profile were lower than those given by the older group ($p < 0.001$) (Table 1).

3.5. Error of the method

Out of the cohort, 28 participants were found to be ready to redo the test 2 months later. The ICC was determined for every participant and every profile type. The average measurements of the ICC are listed in Table 4. Interpretation according to Fleiss showed that values bigger than 0.75 are excellent, that values between 0.40 and 0.75 are average to good, and that values below 0.40 are poor. The ICC of most profile types seemed to be good to excellent. The only poor results were found for the male 1/3 ante and the female 1/3 retro and 5/3 ante profile types. A contradiction in score was found for the male 1/3 retro profile.

4. Discussion

Overall, a Class I profile is still considered to be the most attractive profile in comparison with Class II and Class III Angle

Table 4
 κ -Coefficient for the different profiles.

	Female	Male
Average	0.873	0.764
2/3+	0.425	0.495
Full+	0.559	0.573
1/3+	0.558	0.385
1/3–	0.088	–0.027
2/3–	0.526	0.451
Full–	0.516	0.588
5/3+	0.174	0.832
4/3+	0.404	0.630

Table 3
Ranking of female and male profile (mean values and SD) according to sex preference.

N	Profile	Hetero men		Hetero women		Homosexual men		Homosexual women	
		464		1084		60		99	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Female	Average	57.8 ^a	14.6	59.8 ^{a,c}	13.9	59.6	15.8	63.2 ^c	14.7
	2/3+	57.8	16.2	59.5	14.9	56.7	16.4	56.9	17.0
	1/3+	53.4	13.5	54.8	12.6	53.2	15.9	54.7	14.6
	Full+	50.4	20.9	50.9	19.7	50.1	21.1	50.6	18.6
	1/3–	49.6	11.6	50.1	10.9	48.9	14.4	51.4	12.9
	2/3–	44.0 ^a	15.0	45.8 ^a	13.4	42.3 ^b	16.2	47.8 ^b	15.1
	Full–	34.7 ^a	17.5	36.1 ^a	14.2	35.6	18.6	37.3	14.0
	5/3+	27.6 ^a	21.0	28.7 ^a	18.5	25.8	20.7	25.8	17.4
	4/3+	26.3	20.3	27.2 ^c	18.2	23.3	19.0	23.0 ^c	17.6
Male	Full+	65.0	15.5	74.3	15.6	67.0 ^b	17.6	75.4 ^b	14.9
	2/3+	63.2 ^a	14.5	69.2 ^a	15.4	61.7	17.9	66.7	16.7
	5/3+	57.3 ^a	19.2	68.0 ^a	17.5	55.6 ^b	23.9	67.9 ^b	17.8
	4/3+	59.9 ^a	16.8	66.5 ^a	17.6	60.4	20.7	65.3	16.9
	1/3+	53.8 ^a	12.0	55.4 ^a	14.6	54.5	16.6	54.6	14.6
	Average	47.6	10.8	47.1	11.9	47.7	14.0	45.6	11.7
	1/3–	39.8	14.0	38.7	14.4	39.7	15.7	36.9	14.8
	2/3–	29.1 ^a	15.9	26.8 ^a	15.1	30.3	19.4	26.4	15.7
	Full–	23.5 ^a	16.0	21.8 ^a	15.6	24.1	19.0	21.2	16.4

SD, standard deviation.

^a $p < .05$, significance between heterosexuals.

^b $p < .05$, significance between homosexuals.

^c $p < .05$, significance between heterosexual women and lesbians.

classifications (De Smit and Dermaut, 1984; Spyropoulos, 2001; Hönn et al., 2005; Polk et al., 1995; Sergl et al., 1998). According to Czarnecki, a straighter profile is preferred for males in comparison to a more convex profile in females (Czarnecki et al., 1993). Lines stated that there were no differences in the perception of a male and a female profile; however, De Smit countered that statement (De Smit and Dermaut, 1984; Lines et al., 1978). Such discrepancies among findings might be caused by different methods of assessment.

According to some studies, strong correlations can be found between orthodontists and orthognathic surgeons (Soh et al., 2005; Bell et al., 1985). In particular, a tendency towards fuller lips is more supported by orthodontists (Foster, 1973). Furthermore, general dentists are more negatively influenced by extreme prognathic or retrognathic profile variants. On the other hand, non-professionals are considered more than dentists, orthodontists, or orthognathic surgeons to assign normal ratings to profile drawings (Phillips et al., 1992). Therefore, we can assume in general that in the concept of aesthetics there is an influence of dental or speciality training. Nonetheless, an overall agreement in preference for a Class I profile exists (Phillips et al., 1992; Brisman, 1980; Maple et al., 2005; Kerr and O'Donnell, 1990).

Some investigators postulate that the effect of age on perception of facial attractiveness has little impact (Udry, 1965; Abu Arqoub and Al-Khateeb, 2010; Todd, 2005; Johnston, 2005). However, such studies were small in subject and assessor size and conflicting results exist regarding sex differences in the assessment of facial profile attractiveness. Most studies have failed to find any significant gender difference (De Smit and Dermaut, 1984; Johnston, 2005; Barrer and Ghafari, 1985), though Tedesco did find that female raters judged all of the shown images as more attractive than did male raters (Tedesco et al., 1983).

Currently there is little known about the influence of sexual preferences on the assessment of the facial profile. Prior studies on sexual orientation and preferences for faces that were paired with masculine and feminine behavioural descriptors suggest that homosexual men prefer more masculine men and that homosexual women demonstrate no preference for either masculinity or femininity in women.

In our study we used a mailing list for recruiting the assessors, which started with friends, family, and colleagues. The exponential increase by family and friends excluded confounding factors of personal acquaintances. The choice of using the range of the VAS from 0 to 100, without any restrictions, was made because of simplicity and freedom. The results of our study indicate that the preferred male profile seems to be the straight full ante profile, followed by the straight 2/3 ante profile. For the female facial profile, the straight average profile and the straight 2/3 ante profile appear to be perceived as the most attractive by the whole sample. One could conclude that the preferences for a masculine facial profile concerning the lower anterior face are those slightly more to the ventral, starting from the average profile.

No statistically significant differences could be found between female profile types perceived as the most attractive (average and 2/3 ante profile) or those perceived as least favourable (5/3 ante and 4/3 ante). However, all differences found between the aforementioned profiles and the others were significant. This should justify a classification of preferred and less approved profiles.

For males, the more a profile lies posteriorly (starting from the 1/3 ante profile) the less attractive the profile is assessed by the entire sample. For females, the notion of the straight average profile still being the contemporary norm is supported, but there does appear to be a tendency towards more protruded positions for the anterior lower face. It is clear in our study that the 5/3 ante and 4/3 ante profiles are perceived as being attractive for males, while for

females those profiles were significantly disfavoured. Therefore, one may conclude that bimaxillary protrusion in men is more commonly accepted when compared with women.

5. Conclusion

In a Caucasian population, there is a strong tendency towards a more protruded lower anterior and midface, especially in men. A straight full ante profile is preferred in men, while a straight full retro profile is strongly disliked. The straight average profile and straight 2/3 ante profile are preferred in females, while straight 5/3 and 4/3 ante profiles are disfavoured. Differences were found in ratings by men and women. Nevertheless, ranking according to attractiveness was similar. OMF surgeons and orthodontists rated more protrusive profiles higher than did dentists and non-professionals. Scores of dentists and laymen were not significantly different. The age of the assessor had no influence on the classification of the profile types, however some significant differences in assigning scores were found. These results show a trend towards more protrusion in facial profiles. Distinct measurements were performed based on these prevalences and have been added to the profile planning software www.facewizz.com.

The conclusions help us to guide bimaxillary advancement surgery in obstructive sleep apnoea patients, and in redo skeletal Class II cases with four premolar extractions.

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